GEORGIA INSTITUTE OF TECHNOLOGY OFFICE OF CONTRACT ADMINISTRATION

PROJECT ADMINISTRATION DATA SHEET

[x] ORIGINAL [ ] REVISION NO. _____

Project No. A-3236 DATE 5/11/82

Project Director: George Lee School/Lab EDL/IED

Sponsor: Housing Authority of the City of Winder, GA

Type Agreement: Letter of Authorization dtd. 4/15/82

Award Period: From 4/13/82 To 6/30/82 (Performance) 6/30/82 (Reports)

Sponsor Amount: $2,900 Contracted through:

Cost Sharing: _____ GTRI/~~GIT~~

Title: Noise Assessment Study

ADMINISTRATIVE DATA

OCA Contact Faith Costello

1) Sponsor Technical Contact:

Sam G. Dunaway
Executive Director
Housing Authority of Winder, GA
Box 505
105 Horton St.
Winder, GA
404-867-7495

2) Sponsor Admin/Contractual Matters:

Sam G. Dunaway
Executive Director
Housing Authority of Winder, GA
Box 505
105 Horton St.
Winder, GA
404-867-7495

Defense Priority Rating: N/A

Security Classification: N/A

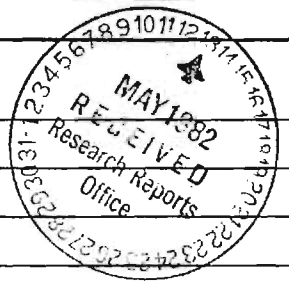
RESTRICTIONS

See Attached N/A Supplemental Information Sheet for Additional Requirements.

Travel: Foreign travel must have prior approval – Contact OCA in each case. Domestic travel requires sponsor approval where total will exceed greater of $500 or 125% of approved proposal budget category.

Equipment: Title vests with sponsor; however, none proposed

COMMENTS:



COPIES TO:

Administrative Coordinator
Research Property Management
Accounting
Procurement/EES Supply Services
Research Security Services
Reports Coordinator (OCA) ✓
Legal Services (OCA)
Library
EES Public Relations (2)
Computer Input
Project File
Other GTRI

FORM OCA 4:781

GEORGIA INSTITUTE OF TECHNOLOGY OFFICE OF CONTRACT ADMINISTRATION

SPONSORED PROJECT TERMINATION SHEET

Date 6/2/82

Project Title: Noise Assessment Study

Project No: A-3236

Project Director: George Lee

Sponsor: Housing Authority of the City of Winder, GA

Effective Termination Date: 5/30/82

Clearance of Accounting Charges: 5/30/82

Grant/Contract Closeout Actions Remaining:

- [x] Final Invoice and ~~Closing Documents~~
- [ ] Final Fiscal Report
- [ ] Final Report of Inventions
- [ ] Govt. Property Inventory & Related Certificate
- [ ] Classified Material Certificate
- [ ] Other _____

Assigned to: EDL/IED (~~School~~/Laboratory)

COPIES TO:

Administrative Coordinator	Research Security Services	EES Public Relations (2)
Research Property Management	~~Reports Coordinator (OCA)~~	Computer Input
Accounting	Legal Services (OCA)	Project File
Procurement/EES Supply Services	Library	Other _____

FORM OCA 10:781

Project A-3236

COMMUNITY NOISE STUDY

for

HUD Housing Project GA. 183-8
Barrow County, Georgia

Prepared for the

Housing Authority of the
City of Winder, Georgia

By

George H. Lee, P.E.
Project Director

Central Georgia Area Office
Industrial Extension Division
Engineering Extension Division
GEORGIA INSTITUTE OF TECHNOLOGY
April 30, 1982

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The actual microphone location was 6' from the planned NE corner of housing units group "A", the Northeasternmost unit, and those closest to the predominate noise sources. This spot was 363' from the centerline of the U. S. Highway 29 right-of-way. See accompanying drawing, page A4.

Also, since a tape measurement showed approximately 49' from U. S. 29 pavement to the railroad track centerline, then the microphone site is approximately 437' from the railroad track centerline.

A tripod was utilized to fix the microphone approximately 4'-6" above the ground. The microphone's centerline was inclined 45^{o} to 70^{o} above the horizontal as recommended by the manufacturer for the best sensitivity. It was pointed toward U. S. Highway 29 and the parallel CSX railroad track.

On occasion a 0.5 mil plastic film was placed over the upper microphone and the 228 Sound Level Meter to protect them from scattered rain showers. Such a film has a minimal affect on accuracy, and then only at higher frequencies. Additionally, a plastic sheet was used to shield equipment from direct rain from above in a lean-to fashion located about 2' above the microphone.

MEASUREMENT DAY SELECTION

Contact was made with the Atlanta, Georgia, offices of the Seaboard Coastline Railroad, now CSX, to obtain rail traffic information. Freight rail traffic is not usually "scheduled." It may be determined, after the fact, whether or not the traffic was typical of previous experience.

Recent traffic totals for two different weeks were received from CSX and are shown graphed in the appendix, page A5. A daily average of 12.9 trains was calculated from the data provided. Most days of the week

were seen to run at or above this twenty-four hour average, with the exception of Wednesdays and Sundays. Again, as mentioned above, it can only be determined after the fact if traffic has, in fact, been as planned.

Measurements were ultimately made during the following three twenty-four hour periods:

(1) Day 1 - 9:30 AM, April 19, 1982, to
9:30 AM, April 20, 1982. (Monday - Tuesday)

(2) Day 2 - 9:32 AM, April 20, 1982, to
9:32 AM, April 21, 1982. (Tuesday - Wednesday)

(3) Day 3 - 9:32 AM, April 21, 1982, to
9:32 AM, April 22, 1982. (Wednesday - Thursday)

EQUIPMENT AND METHODS USED

Primary data was taken with the Quest Electronics Model 142-228-12T Equivalent Sound Level Recorder System. Specific equipment used was the Model 228 Integrating Sound Level Meter, Serial No. Z0010002; Model 142 Graphic Level Recorder, Serial No. C001889; and the Model CA-12 Sound Calibrator, Serial No. U0010040. Measurement accuracy of this system is ± 1.0 dBA over its temperature range of -10° C to $+50^{\circ}$ C. Outside temperature was within these limits during the tests and the equipment was satisfactorily calibrated at all times.

This system is specifically intended for the measurement of community noise levels when such noise descriptors as L_{dn} or L_{eq} are required. Samples are made continuously and integrated to yield equivalent levels corresponding to selectable measurement sub-intervals. These sub-interval levels are actually L_{eq} values. In this case, in order to achieve reasonable resolution of the noise history, a four minute sub-interval was chosen. This yielded 360 sub-intervals per twenty-four hour period.

The dynamic range setting of the Sound Level Meter used was 40 to 80 dBA. It operated in the fast time-averaging mode as required by the HUD regulations appendix to Subpart B.

A cross-check of the above measurement system was made with a Bruel & Kjaer 2209 Type I Impulse Precision Sound Level Meter, Serial No. 594740; recorded to a B & K Type 2306 Graphic Level Recorder, Serial No. 616003; and calibrated with a B & K Type 4220 Pistonphone, Serial No. 577874. A Quest four minute sub-interval L_{eq} level of 50.0 dBA was correspondingly calculated using samples from the B & K recorder tape output. These calculations yielded 51.0 dBA for good correlation of the two systems, considering data variation and use of a 3.0 second sampling.

Very occasional late night levels less than 40 dBA probably occurred, but they are entered into data reduction as 40 dBA. Any difference between actual and 40 dBA levels are truly of minimum consequence, when considering the type of logarithmic additions which followed to arrive at the L_{dn} level.

Data levels for the brief periods of time during which calibration checks were made were estimated, usually with the levels existing either just prior to, or just following the check. Calibration checks or other interruptions (such as to change paper) were made during relatively quiet periods of time, i.e. no trains, except in one case. For that case, the sub-interval totally including the train noise was observed on the meter and used.

The Model 228 was powered with a 9-Volt battery eliminator. The Model 142, too, was powered from a nearby home approximately 325' away from the measurement spot. A 4.2 amp current draw meant that voltage drop on such long length of cable was not significant. Battery operation was possible, however, if it had been required.

Recommended windscreens were in place at all times.

Recorded data was manually read, recorded, and totaled. It was then inputted to a Tektronix Model OPT1 Computer, Serial No. 3021085 (also Bruel & Kjaer Model 183, Serial No. 106).

RESULTS

Raw data from the Graphic Level Recorder was estimated to the nearest 0.2 dBA, i.e., .0, .2, .4, or .8 dBA. For the purposes of simplifying the presentation in this report these levels were rounded to the nearest 0.5 dBA, i.e. levels estimated at X.8, X.0, or X.2 are shown as X.0, while levels estimated at X.4, or X.6 are shown as X.5, levels. See pages A6 through A17.

Data from Day 1 yielded an L_{dn} of 66.1 dBA.

Only two twenty-four hour days of measurements were contracted. However, due to rain impact on the first day, an additional, third, day was measured consecutively with the second. Statham police had been asked to note any times of night when there was heavy rain and/or thunder. They noted that the period from 4:00 AM to 6:00 AM on April 20, 1982, during Day 1, did have such rain and some thunder. Although they were asked to call if it became very heavy, they did not do that. Data during an eighty-eight minute period was judged by looking at the tapes to be articically elevated due to the rain and thunder. These levels (13 in the 60's and 9 in the 50's) were estimated to more representatively be 53.0. Two levels of 65.4 and 71.0 were judged due to train passage and were left in the calculations. See Appendix page A36. The adjusted Day 1 level is 65.5 dBA.

Computer data tape copies are presented on pages A18 through A35 for all days. Poor copies are because the printing is in blue. These

tapes are raw, unadjusted data.

Data from Day 2 yielded an L_{dn} of 63.9 dBA.

Data from Day 3 yielded an L_{dn} of 64.0 dBA.

The L_{dn} community noise descriptor is, by definition, a twenty-four hour descriptor. It is illustrative, however, to combine data to get an "average" such level on several days. Days 1, 2, and 3, as well as Days 1A, 2, and 3 were considered together, as if triple the number of data points were taken in a twenty-four hour period. The resulting levels were 64.8 and 64.5 dBA, respectively. See page A38.

COMMENTS

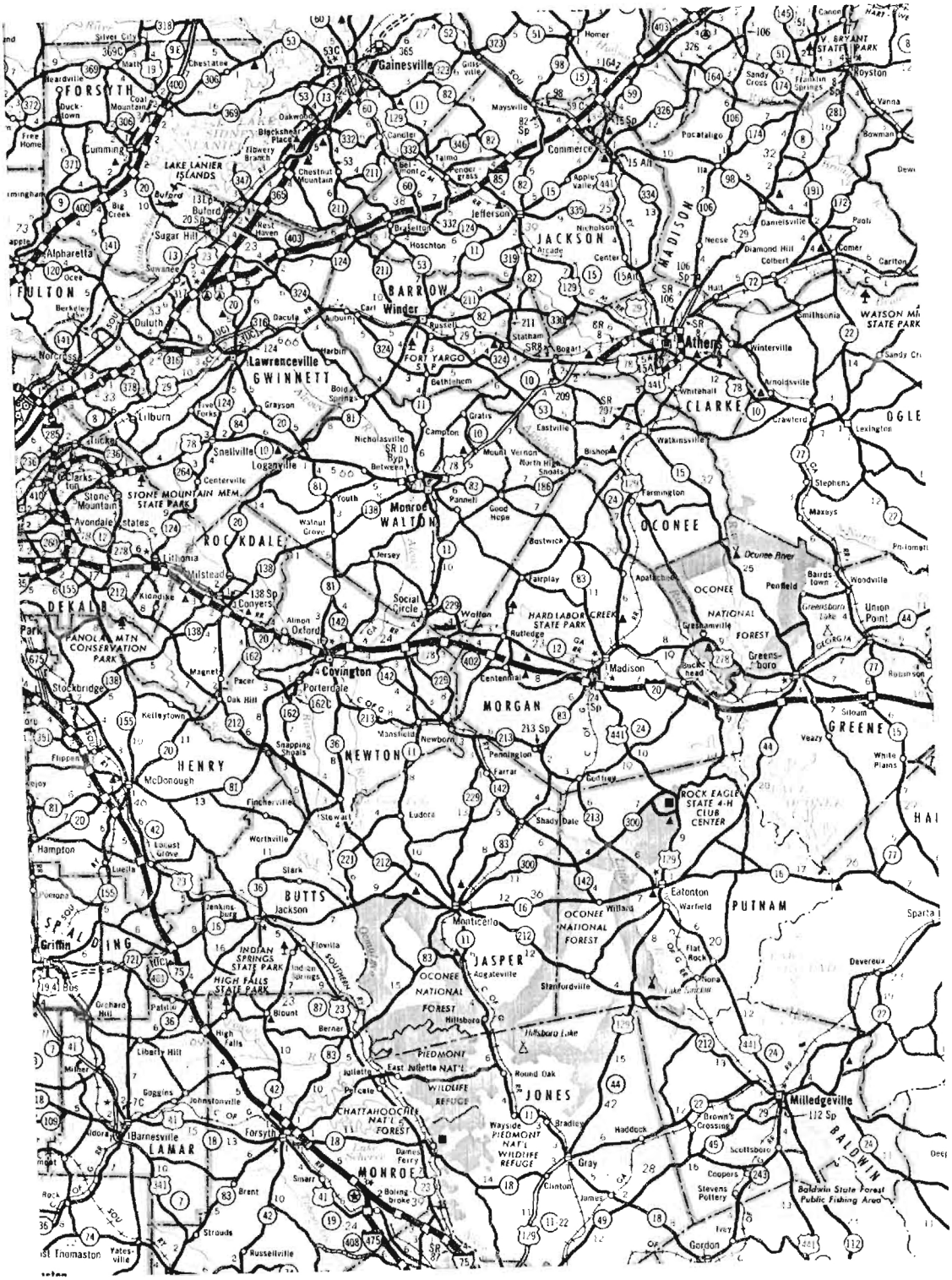
It was not the intent of this study to draw conclusions from the data, but rather to try to measure as accurately as possible the L_{dn} levels found to exist on measurement days which were thought to be as typical as possible of the noise environment at the site under consideration.

As data measurement progressed, effort was made to record as much data as possible about train and highway traffic. See page A39.

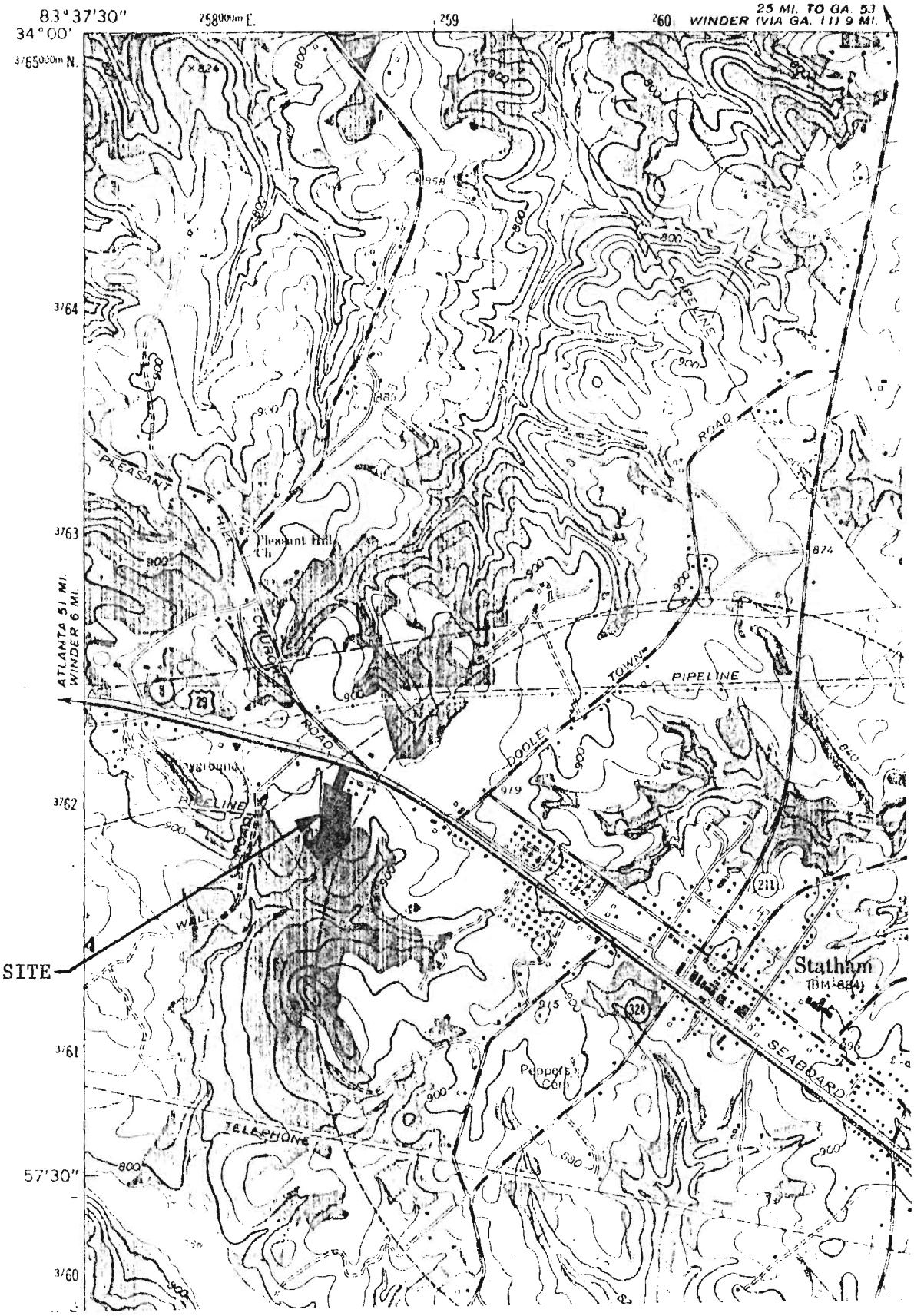
APPENDICES

GEORGIA HIGHWAY MAP (Portion)

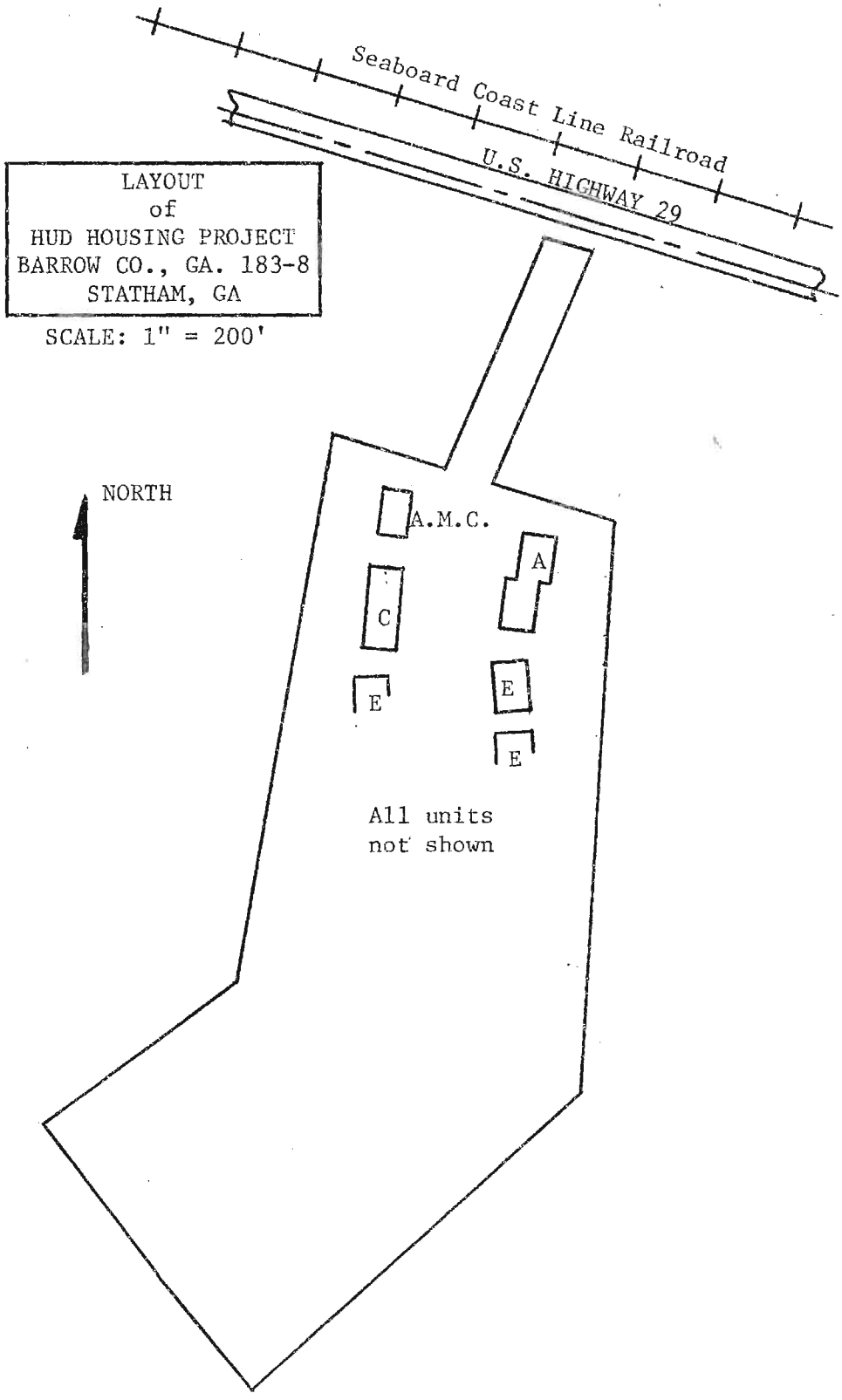
SCALE: 1" = About 13.3 Miles



UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

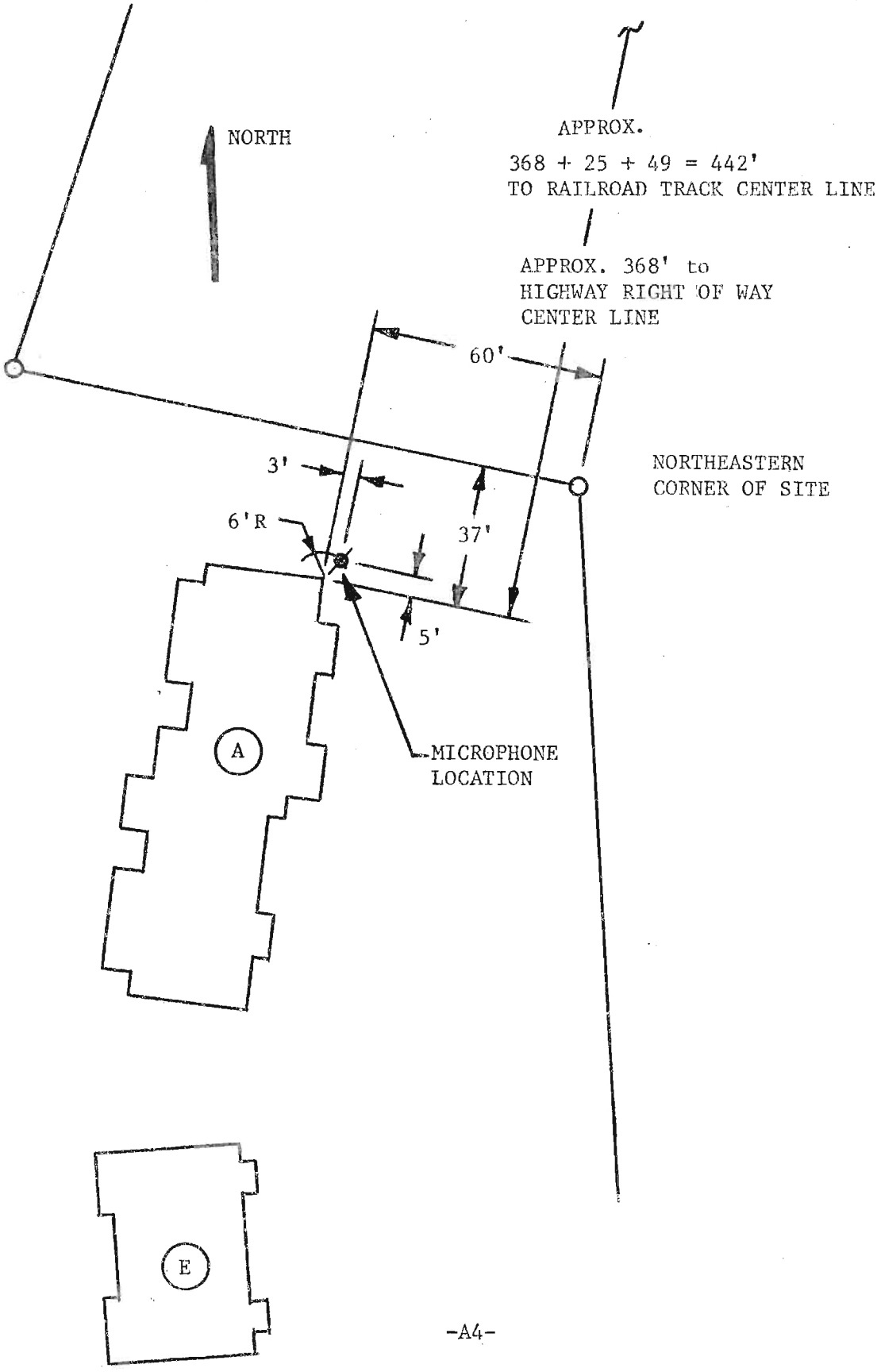


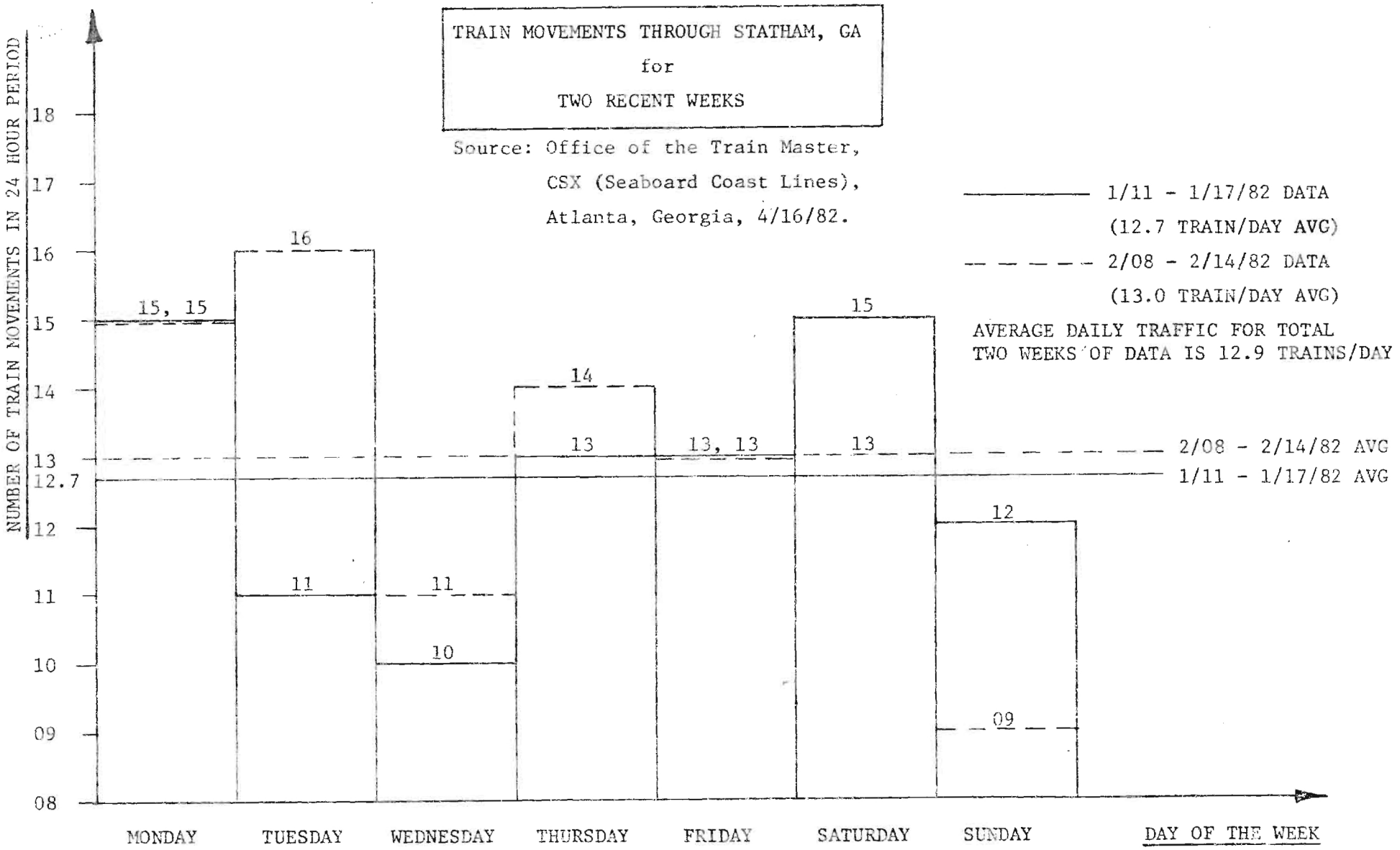
STATHAM, GA AREA TOPOLOGICAL MAP
SCALE: 1:24,000

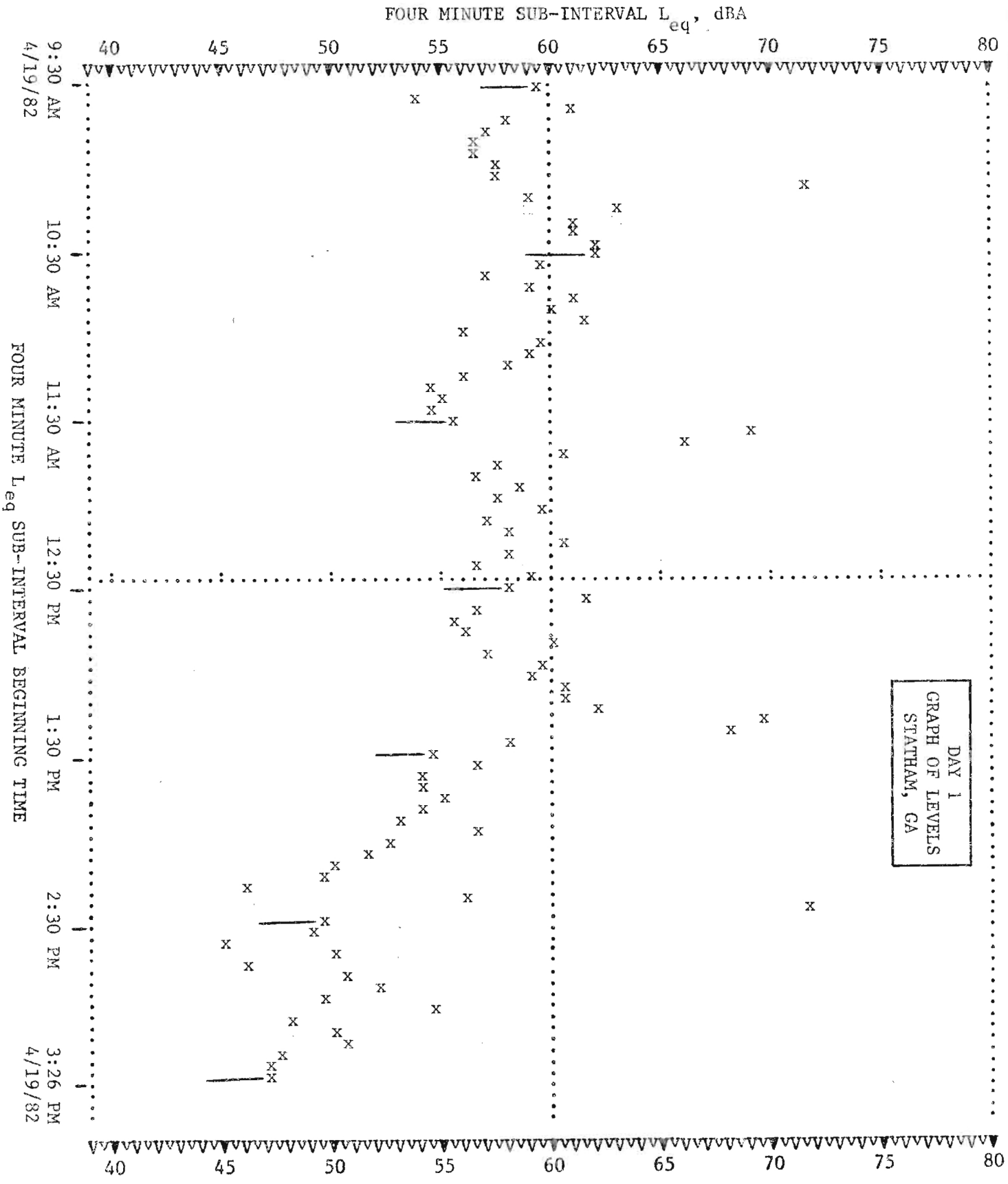

Seaboard Coast Line Railroad
U.S. HIGHWAY 29
LAYOUT
of
HUD HOUSING PROJECT
BARROW CO., GA. 183-8
STATHAM, GA
SCALE: 1" = 200'
NORTH
A.M.C.
A
C
E
E
E
All units
not shown

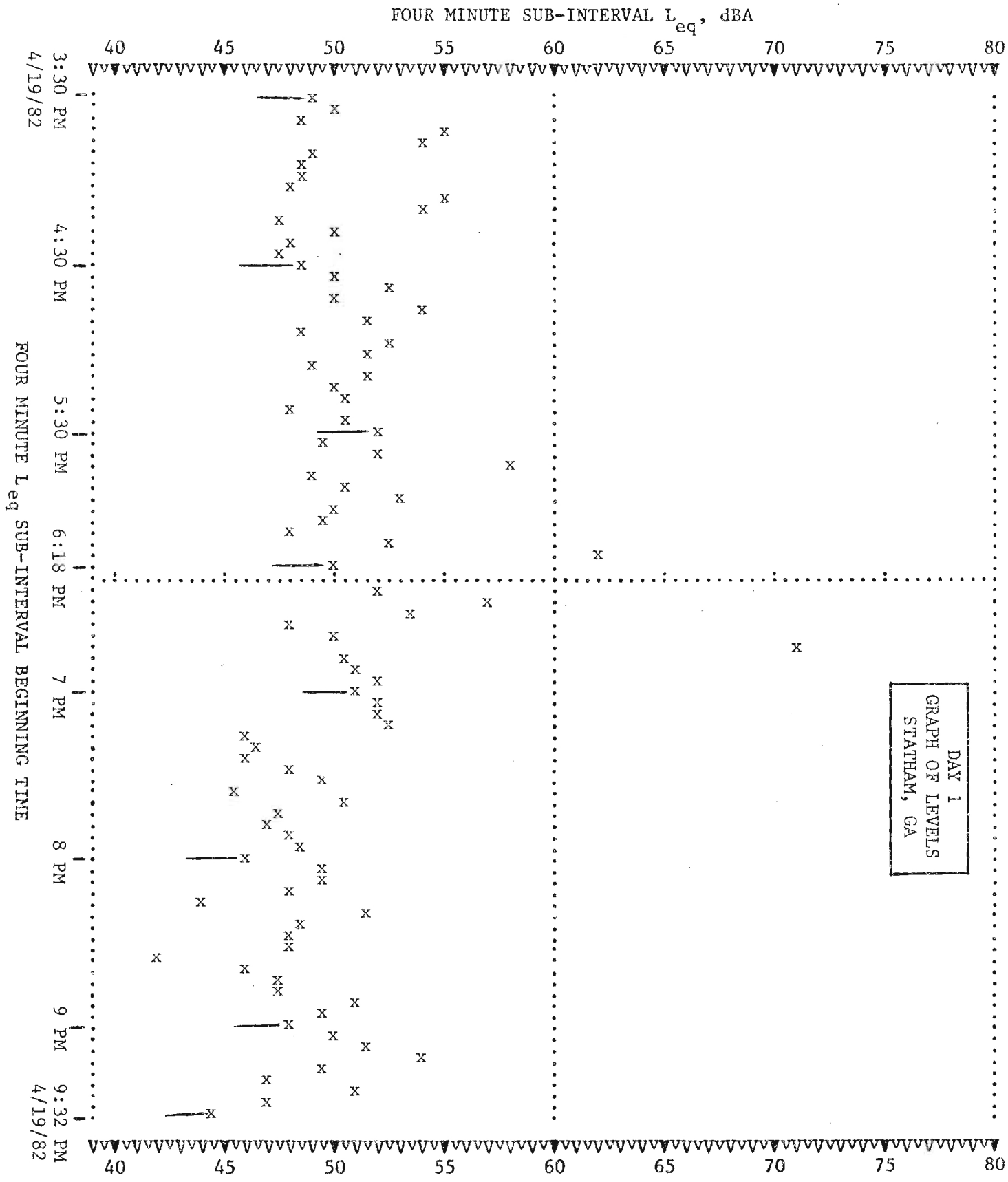
MICROPHONE LOCATION DRAWING
for
HUD HOUSING PROJECT
BARROW CO., GA. 183-8
STATHAM, GA

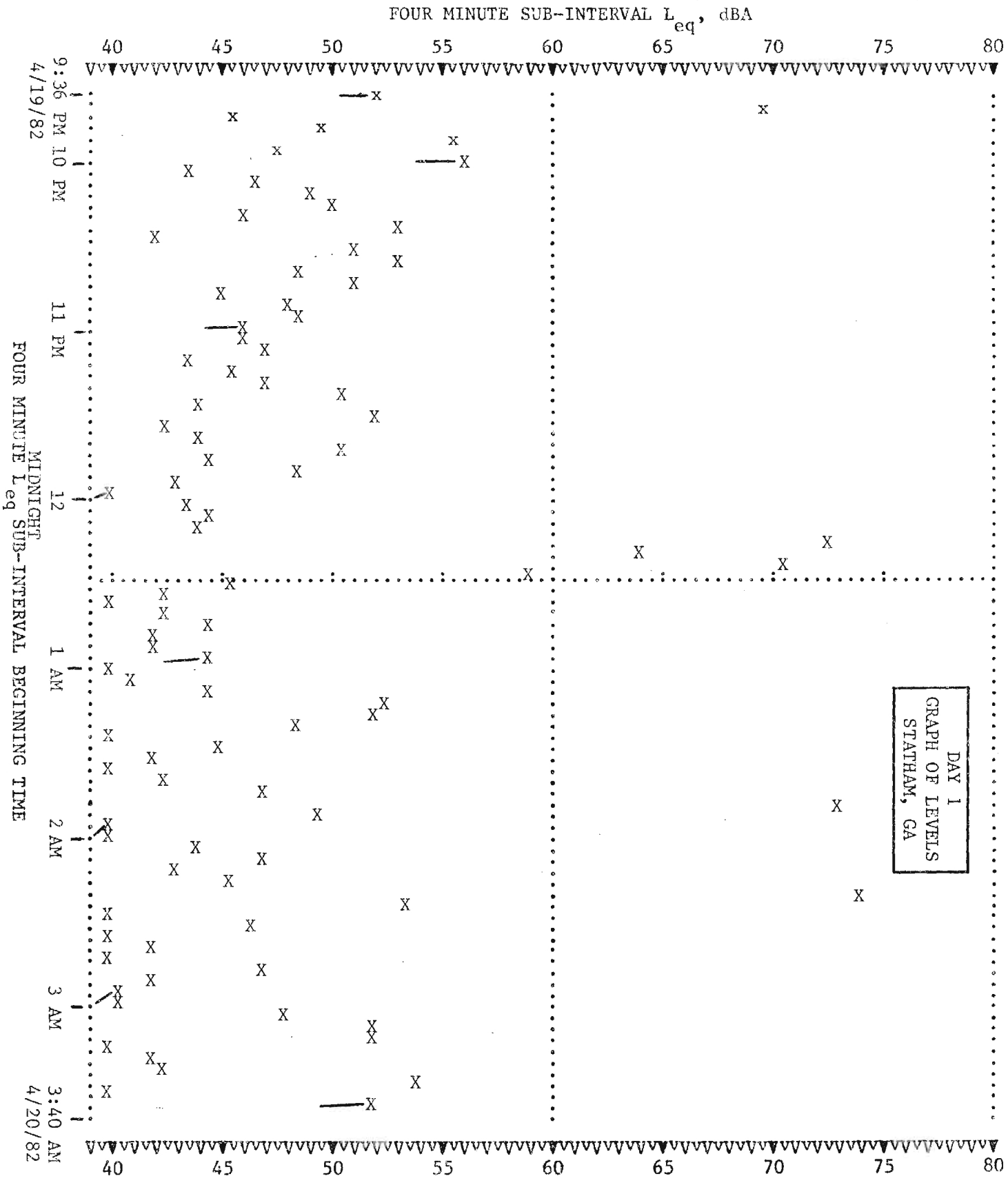
SCALE: 1" = 40'

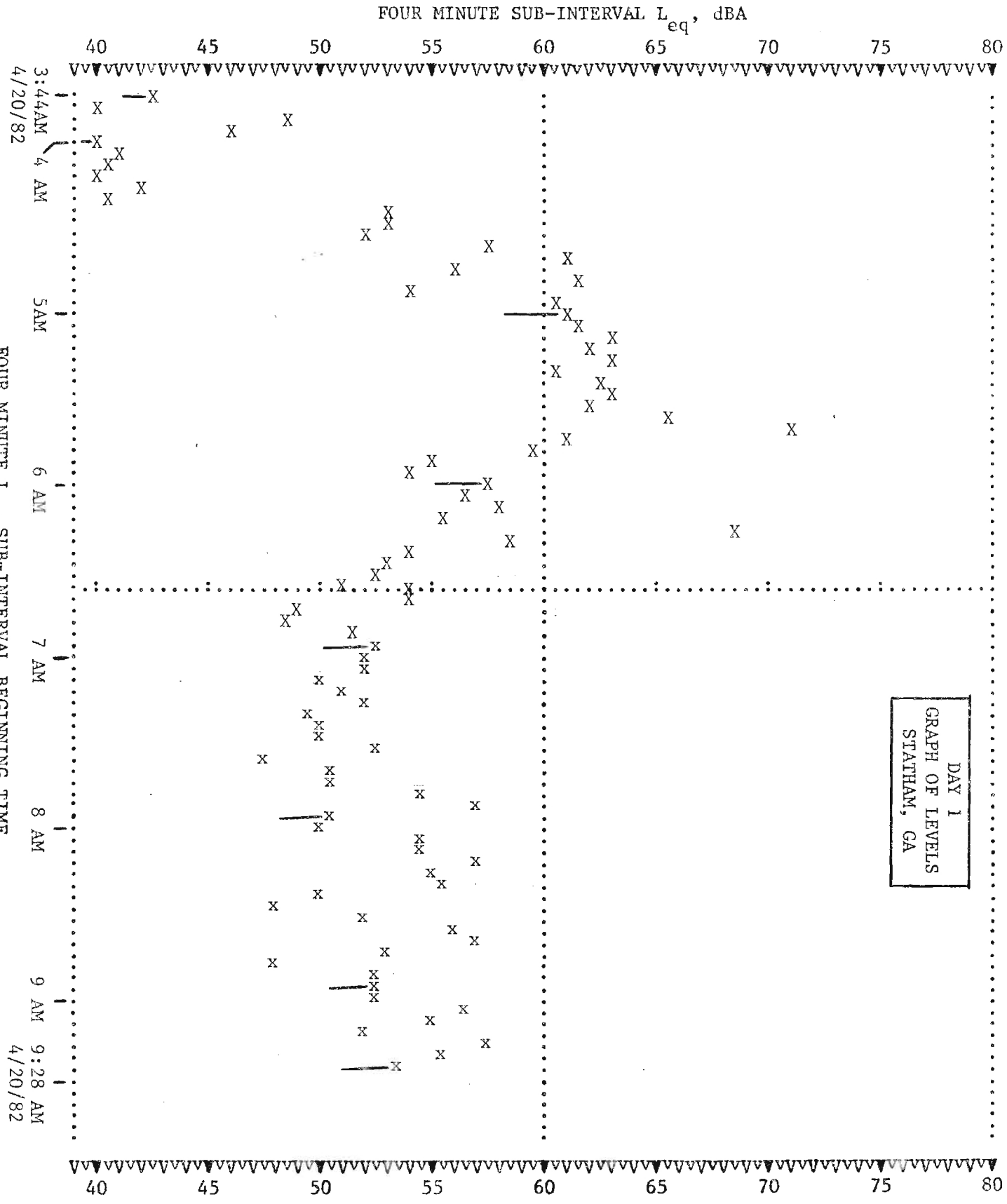



TRAIN MOVEMENTS THROUGH STATHAM, GA
for
TWO RECENT WEEKS
Source: Office of the Train Master,
CSX (Seaboard Coast Lines),
Atlanta, Georgia, 4/16/82.
1/11 - 1/17/82 DATA
(12.7 TRAIN/DAY AVG)
2/08 - 2/14/82 DATA
(13.0 TRAIN/DAY AVG)
AVERAGE DAILY TRAFFIC FOR TOTAL
TWO WEEKS OF DATA IS 12.9 TRAINS/DAY
2/08 - 2/14/82 AVG
1/11 - 1/17/82 AVG
NUMBER OF TRAIN MOVEMENTS IN 24 HOUR PERIOD
18
17
16
15
14
13
12.7
12
11
10
09
08
15, 15
16
11
11
10
14
13
13, 13
13
15
12
09
MONDAY
TUESDAY
WEDNESDAY
THURSDAY
FRIDAY
SATURDAY
SUNDAY
DAY OF THE WEEK

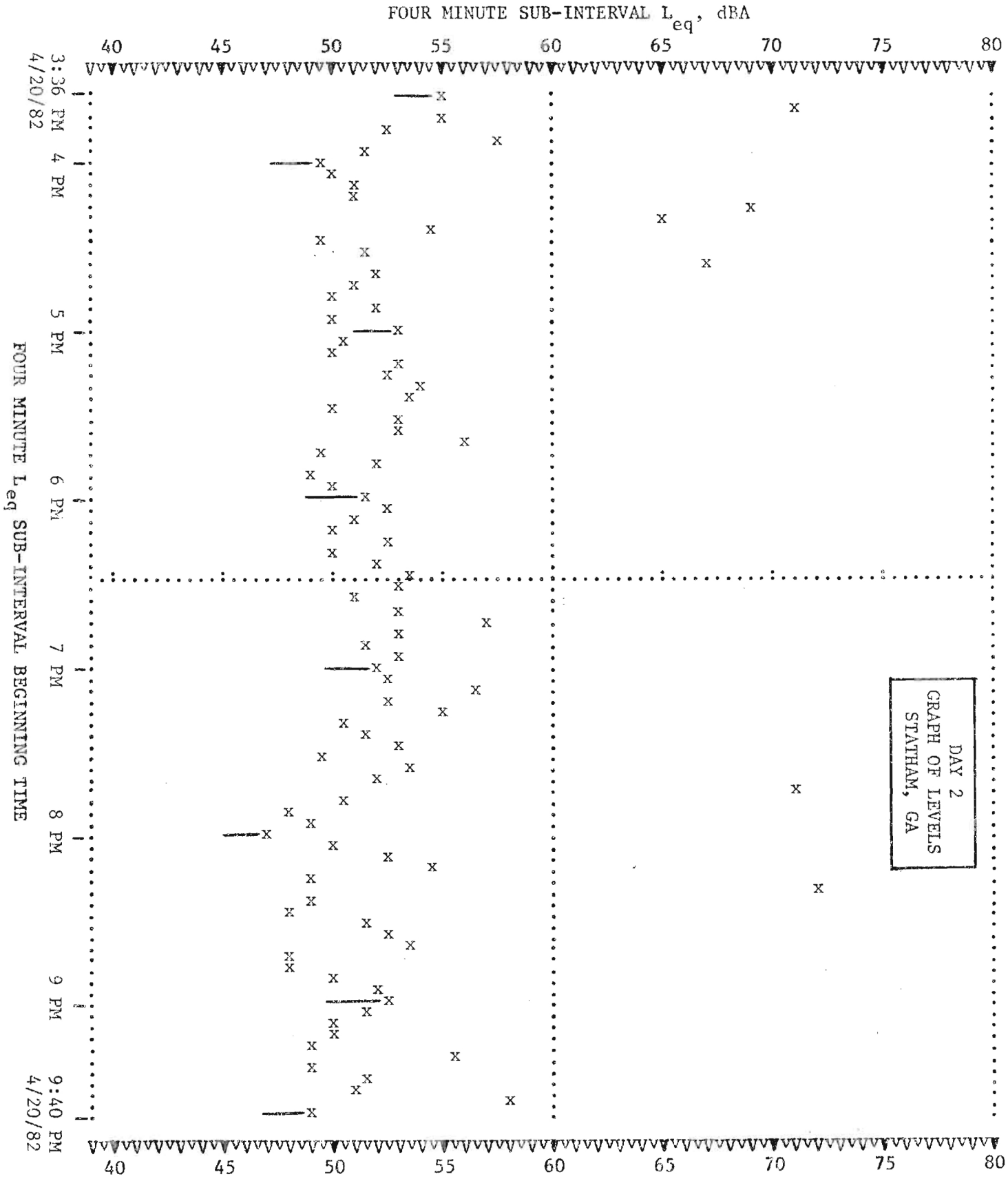

FOUR MINUTE SUB-INTERVAL L_{eq}, dBA
40
45
50
55
60
65
70
75
80
FOUR MINUTE L_{eq} SUB-INTERVAL BEGINNING TIME
9:30 AM
4/19/82
10:30 AM
11:30 AM
12:30 PM
1:30 PM
2:30 PM
3:26 PM
4/19/82
DAY 1
GRAPH OF LEVELS
STATHAM, GA

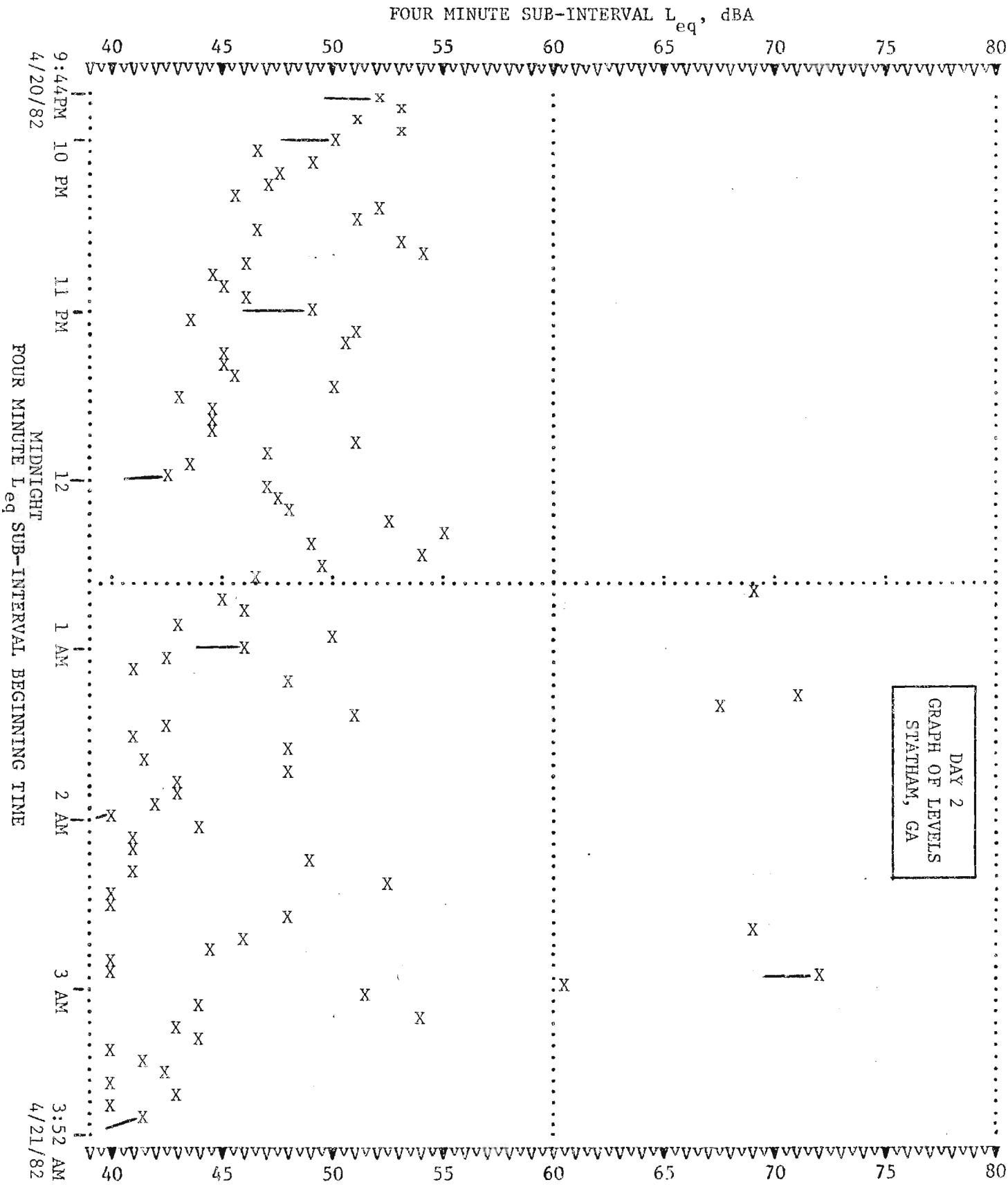

FOUR MINUTE SUB-INTERVAL L_{eq}, dBA
40
45
50
55
60
65
70
75
80
3:30 PM
4/19/82
4:30 PM
5:30 PM
6:18 PM
7 PM
8 PM
9 PM
9:32 PM
4/19/82
FOUR MINUTE L_{eq} SUB-INTERVAL BEGINNING TIME
DAY 1
GRAPH OF LEVELS
STATHAM, GA

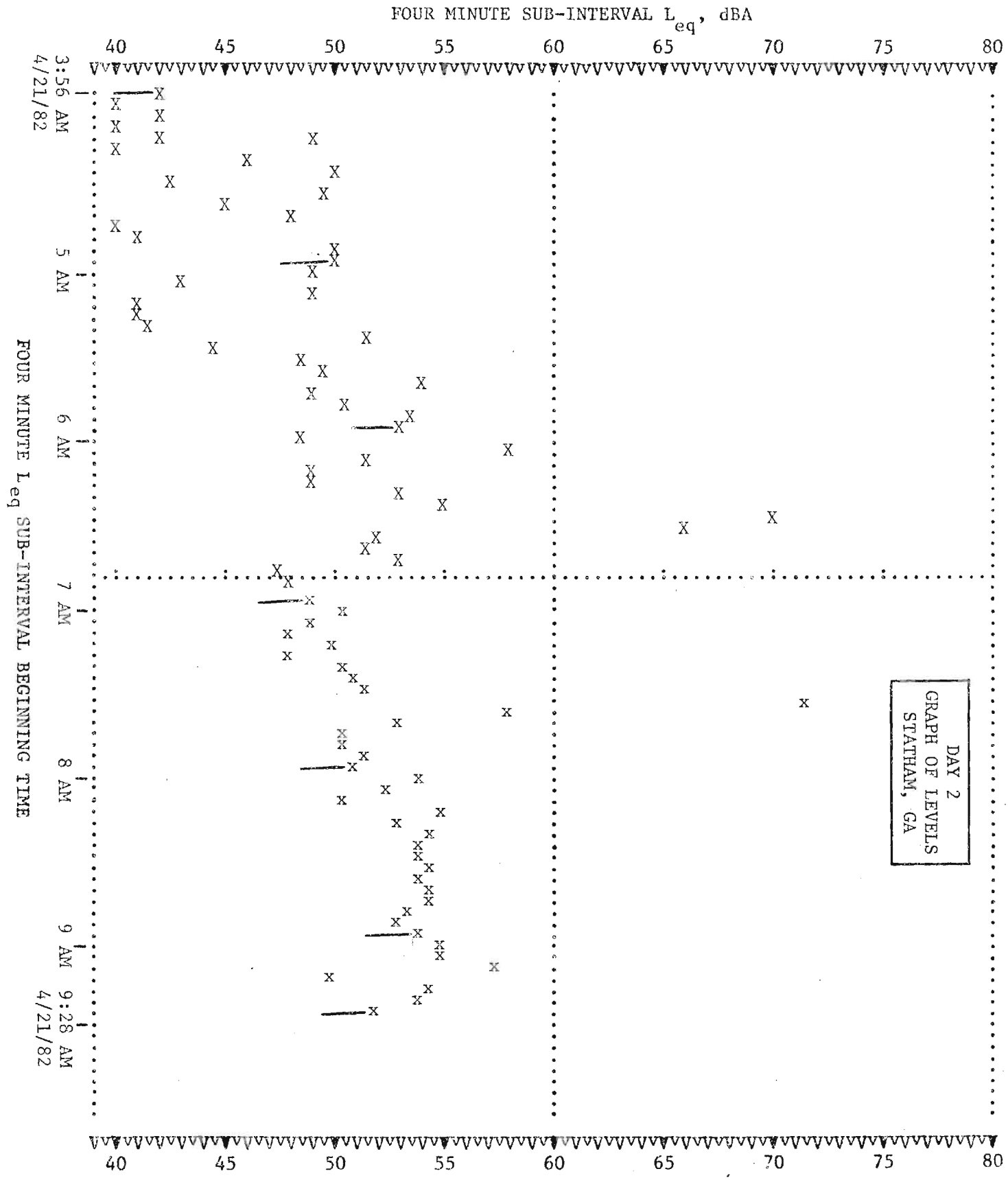

FOUR MINUTE SUB-INTERVAL L_{eq}, dBA
40
45
50
55
60
65
70
75
80
9:36 PM 4/19/82
10 PM
11 PM
MIDNIGHT
1 AM
2 AM
3 AM
3:40 AM 4/20/82
FOUR MINUTE L_{eq} SUB-INTERVAL BEGINNING TIME
DAY 1
GRAPH OF LEVELS
STATHAM, GA


FOUR MINUTE SUB-INTERVAL L_{eq}, dBA
40
45
50
55
60
65
70
75
80
FOUR MINUTE L_{eq} SUB-INTERVAL BEGINNING TIME
3:44AM 4/20/82
4 AM
5AM
6 AM
7 AM
8 AM
9 AM
9:28 AM 4/20/82
DAY 1
GRAPH OF LEVELS
STATHAM, GA

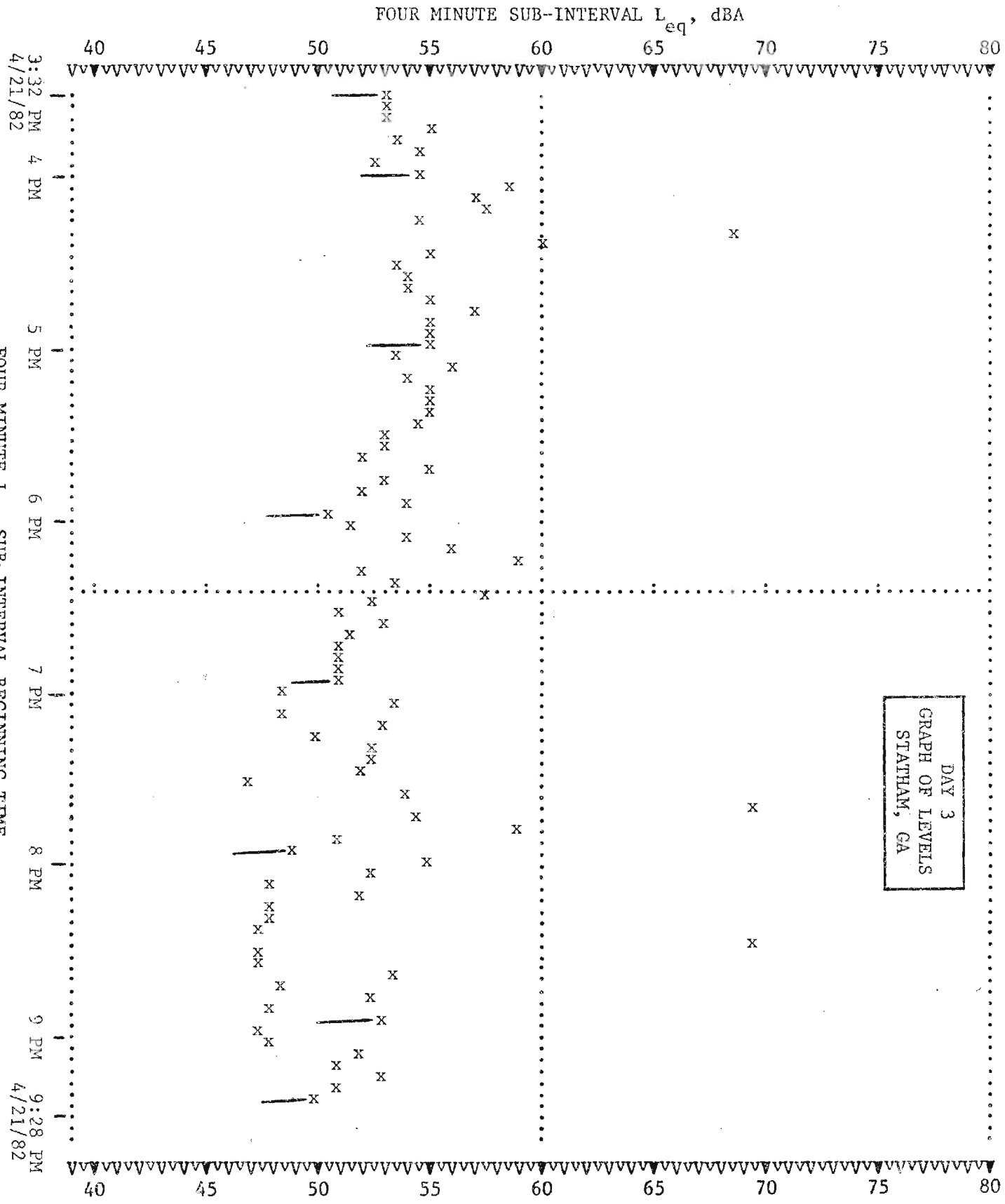
DAY 2
GRAPH OF LEVELS
STATHAM, GA
FOUR MINUTE SUB-INTERVAL L_{eq}, dBA
80
75
70
65
60
55
50
45
40
9:32 AM
4/20/82
10 AM
11 AM
12 NOON
1 PM
2 PM
3 PM
3:32 PM
4/20/82
FOUR MINUTE L_{eq} SUB-INTERVAL BEGINNING TIME


FOUR MINUTE SUB-INTERVAL L_{eq}, dBA
40
45
50
55
60
65
70
75
80
3:36 PM 4/20/82
4 PM
5 PM
6 PM
7 PM
8 PM
9 PM
9:40 PM 4/20/82
FOUR MINUTE L_{eq} SUB-INTERVAL BEGINNING TIME
DAY 2
GRAPH OF LEVELS
STATHAM, GA

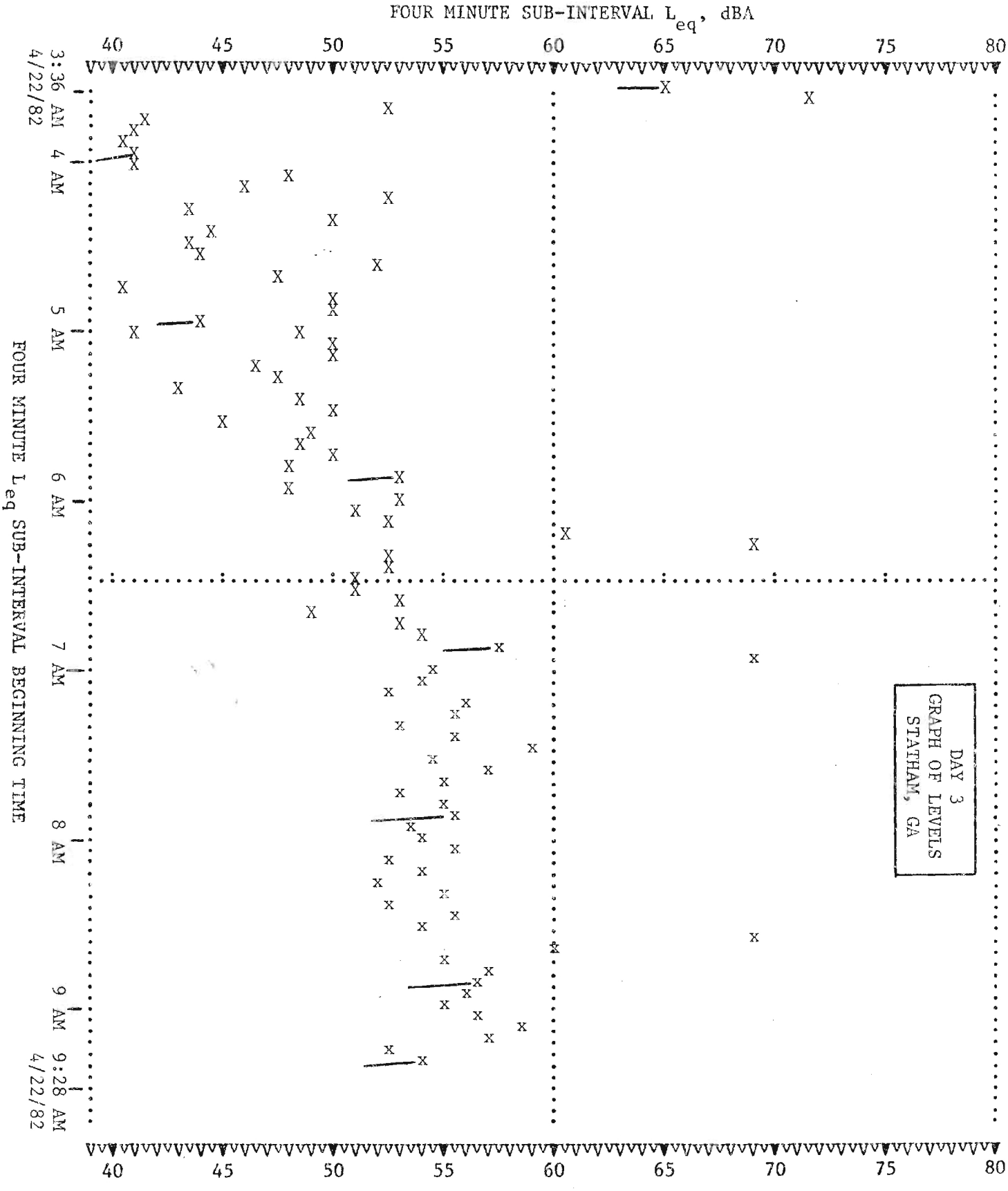

FOUR MINUTE SUB-INTERVAL L_{eq}, dBA
40
45
50
55
60
65
70
75
80
9:44PM
4/20/82
10 PM
11 PM
MIDNIGHT
12
1 AM
2 AM
3 AM
3:52 AM
4/21/82
FOUR MINUTE L_{eq} SUB-INTERVAL BEGINNING TIME
DAY 2
GRAPH OF LEVELS
STATHAM, GA


FOUR MINUTE SUB-INTERVAL L_{eq}, dBA
40
45
50
55
60
65
70
75
80
3:56 AM
4/21/82
5 AM
6 AM
7 AM
8 AM
9 AM
9:28 AM
4/21/82
FOUR MINUTE L_{eq} SUB-INTERVAL BEGINNING TIME
DAY 2
GRAPH OF LEVELS
STATHAM, GA

DAY 3
GRAPH OF LEVELS
STATHAM, GA
FOUR MINUTE SUB-INTERVAL L_{eq}, dBA
80
75
70
65
60
55
50
45
40
9:32 AM
4/21/82
10 AM
11 AM
12 NOON
1 PM
2 PM
3 PM
3:28 PM
4/21/82
FOUR MINUTE L_{eq} SUB-INTERVAL BEGINNING TIME


FOUR MINUTE SUB-INTERVAL L_{eq}, dBA
40
45
50
55
60
65
70
75
80
3:32 PM 4/21/82
4 PM
5 PM
6 PM
7 PM
8 PM
9 PM
9:28 PM 4/21/82
FOUR MINUTE L_{eq} SUB-INTERVAL BEGINNING TIME
DAY 3
GRAPH OF LEVELS
STATHAM, GA

DAY 3
GRAPH OF LEVELS
STATHAM, GA
FOUR MINUTE SUB-INTERVAL L_{eq}, dBA
40
45
50
55
60
65
70
75
80
9:32 PM
4/21/82
10 PM
11 PM
12
MIDNIGHT
1 AM
2 AM
3 AM
3:32 AM
4/22/82
FOUR MINUTE L_{eq} SUB-INTERVAL BEGINNING TIME


FOUR MINUTE SUB-INTERVAL L_{eq}, dBA
40
45
50
55
60
65
70
75
80
3:36 AM
4/22/82
4 AM
5 AM
6 AM
7 AM
8 AM
9 AM
9:28 AM
4/22/82
FOUR MINUTE L_{eq} SUB-INTERVAL BEGINNING TIME
DAY 3
GRAPH OF LEVELS
STATHAM, GA

COMMUNITY
NOISE
LEQ/LDN
PROGRAM

FOR DAY 1

DAYTIME DATA
ENTER NUMBER
OF OCCURENCE

40.
0.

40.2
0.

40.4
0.

40.6
0.

40.8
0.

41.
0.

41.2
0.

41.4
0.

41.6
0.

41.8
0.

42.
0.

42.2
1.

42.4
0.

42.6
0.

42.8
0.

43.
0.

43.2
0.

1-1

43.4
0.

43.6
0.

43.8
0.

44.
0.

44.2
1.

44.4
1.

44.6
0.

44.8
1.

45.
0.

45.2
0.

45.4
1.

45.6
1.

45.8
0.

46.
3.

46.2
3.

46.4
1.

46.6
0.

46.8
1.

47.
1.

1-2

COMPUTER
DATA TAPE
FOR
STATHAM, GA

Page 1 of 18

47.2
3.

47.4
5.

47.6
3.

47.8
3.

48.
6.

48.2
5.

48.4
1.

48.6
6.

48.8
1.

49.
2.

49.2
2.

49.4
7.

49.6
5.

49.8
3.

50.
9.

50.2
5.

50.4
4.

50.6
6.

50.8
2.

51.
0.

1-3

COMPUTER
DATA TAPE
FOR
STATHAM, GA

51.2
3.
51.4
4.
51.6
2.
51.8
3.
52.
3.
52.2
7.
52.4
6.
52.6
4.
52.8
1.
53.
1.
53.2
1.
53.4
2.
53.6
0.
53.8
1.
54.
3.
54.2
4.
54.4
2.
54.6
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54.8
1.
55.
2.

55.2
3.
55.4
1.
55.6
4.
55.8
0.
56.
3.
56.2
2.
56.4
3.
56.6
5.
56.8
4.
57.
2.
57.2
2.
57.4
2.
57.6
3.
57.8
3.
58.
2.
58.2
2.
58.4
1.
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0.
58.8
2.
59.
1.

59.2
2.
59.4
3.
59.6
2.
59.8
1.
60.
0.
60.2
1.
60.4
3.
60.6
1.
60.8
2.
61.
2.
61.2
0.
61.4
2.
61.6
0.
61.8
0.
62.
3.
62.2
1.
62.4
0.
62.6
0.
62.8
0.
63.
0.

COMPUTER
DATA TAPE
FOR
STATHAM, GA
Page 3 of 18

63.2
1.
63.4
0.
63.6
0.
63.8
0.
64.
0.
64.2
0.
64.4
0.
64.6
0.
64.8
0.
65.
0.
65.2
0.
65.4
0.
65.6
0.
65.8
0.
66.
0.
66.2
1.
66.4
0.
66.6
0.
66.8
0.
67.

67.2
0.
67.4
0.
67.6
0.
67.8
1.
68.
0.
68.2
0.
68.4
0.
68.6
0.
68.8
0.
69.
0.
69.2
1.
69.4
1.
69.6
1.
69.8
0.
70.
0.
70.2
0.
70.4
0.
70.6
0.
70.8
1.
71.
0.

71.2
0.
71.4
0.
71.6
2.
71.8

"DAY" HRS.
LEQ EQUALS
58.14574598

NIGHT DATA
ENTER NUMBER
OF OCCURENCE
40.
15.

40.2
0.
40.4
4.
40.6
0.
40.8
0.
41.
0.
41.2
2.
41.4
0.
41.6
0.
41.8
3.
42.
0.
42.2
5.
42.4
0.
42.6
6.

1-7 1-8 1-9

42.8 0.	46.8 3.	50.8 0.
43. 2.	47. 2.	51. 1.
43.2 0.	47.2 0.	51.2 2.
43.4 1.	47.4 0.	51.4 1.
43.6 2.	47.6 0.	51.6 0.
43.8 3.	47.8 0.	51.8 5.
44. 0.	48. 1.	52. 0.
44.2 1.	48.2 1.	52.2 1.
44.4 2.	48.4 4.	52.4 1.
44.6 3.	48.6 2.	52.6 1.
44.8 1.	48.8 0.	52.8 0.
45. 1.	49. 1.	53. 3.
45.2 0.	49.2 1.	53.2 2.
45.4 0.	49.4 1.	53.4 1.
45.6 3.	49.6 0.	53.6 0.
45.8 3.	49.8 0.	53.8 1.
46. 0.	50. 1.	54. 3.
46.2 1.	50.2 0.	54.2 2.
46.4 1.	50.4 2.	54.4 0.
46.6 1.	50.6 0.	54.6 0.

COMPUTER DATA TAPE FOR STATHAM, GA

COMPUTER
DATA TAPE
FOR
STATHAM, GA
Page 5 of 18

54.8	58.8	62.8
0.	1.	0.
55.	59.	63.
0.	0.	2.
55.2	59.2	63.2
1.	0.	1.
55.4	59.4	63.4
0.	1.	0.
55.6	59.6	63.6
1.	0.	0.
55.8	59.8	63.8
0.	0.	0.
56.	60.	64.
1.	0.	1.
56.2	60.2	64.2
1.	0.	0.
56.4	60.4	64.4
1.	1.	0.
56.6	60.6	64.6
0.	1.	0.
56.8	60.8	64.8
0.	3.	0.
57.	61.	65.
0.	0.	0.
57.2	61.2	65.2
0.	0.	0.
57.4	61.4	65.4
1.	1.	1.
57.6	61.6	65.6
1.	1.	0.
57.8	61.8	65.8
0.	1.	0.
58.	62.	66.
0.	0.	0.
58.2	62.2	66.2
1.	1.	0.
58.4	62.4	66.4
0.	1.	0.
58.6	62.6	66.6
1.	0.	0.

66.8
0.

67.
0.

67.2
0.

67.4
0.

67.6
0.

67.8
0.

68.
0.

68.2
0.

68.4
0.

68.6
1.

68.8
0.

69.
0.

69.2
0.

69.4
0.

69.6
0.

69.8
0.

70.
0.

70.2
0.

70.4
1.

70.6
0.

1-16

70.8
0.

71.
1.

71.2
0.

71.4
0.

71.6
0.

71.8
0.

72.
0.

72.2
0.

72.4
1.

72.6
0.

72.8
0.

73.
0.

73.2
1.

73.4
0.

73.6
0.

73.8
0.

74.
1.

74.2
0.

74.4

"NIGHT" HRS INCLUDING 10 dBA
LEQ EQUALS
69.9734552

1-17

COMPUTER DATA TAPE FOR STATHAM, GA

24-HOUR
LDNXLEQ
EQUALS
66.13217414

DAY 1
LDN

M
360.

NUM
1477474231.

1-18

COMMUNITY
NOISE
LEQ/LDN
PROGRAM

FOR
DAY 2

DAYTIME DATA
ENTER NUMBER
OF OCCURENCE

40.
0.

40.2
0.

40.4
0.

40.6
0.

40.8
0.

41.
0.

41.2
0.

41.4
0.

41.6
0.

41.8
0.

42.
0.

42.2
0.

42.4
0.

42.6
0.

42.8
0.

43.
0.

2-1

43.2
0.

43.4
0.

43.6
0.

COMPUTER
DATA TAPE
FOR
STATHAM, GA

Page 7 of 18

43.8
0.

44.
0.

44.2
0.

44.4
0.

44.6
0.

44.8
0.

45.
0.

45.2
0.

45.4
0.

45.6
0.

45.8
0.

46.
0.

46.2
0.

46.4
0.

46.6
0.

46.8
1.

47.
0.

2-2

47.2
0.

47.4
1.

47.6
0.

47.8
0.

48.
3.

48.2
3.

48.4
0.

48.6
1.

48.8
3.

49.
6.

49.2
4.

49.4
4.

49.6
0.

49.8
5.

50.
7.

50.2
6.

50.4
4.

50.6
7.

50.8
5.

51.
6.

2-3

51.2	55.2	59.2
3.	6.	2.
51.4	55.4	59.4
10.	1.	0.
51.6	55.6	59.6
7.	3.	2.
51.8	55.8	59.8
6.	1.	0.
52.	56.	60.
9.	2.	0.
52.2	56.2	60.2
4.	1.	0.
52.4	56.4	60.4
8.	1.	0.
52.6	56.6	60.6
6.	1.	0.
52.8	56.8	60.8
3.	2.	0.
53.	57.	61.
10.	1.	0.
53.2	57.2	61.2
3.	1.	0.
53.4	57.4	61.4
4.	2.	0.
53.6	57.6	61.6
5.	4.	0.
53.8	57.8	61.8
3.	0.	0.
54.	58.	62.
3.	2.	0.
54.2	58.2	62.2
4.	1.	0.
54.4	58.4	62.4
9.	0.	1.
54.6	58.6	62.6
10.	0.	0.
54.8	58.8	62.8
3.	1.	0.
55.	59.	63.
4.	1.	0.

COMPUTER DATA TAPE FOR STATHAM, GA

2-4 2-5 2-6

COMPUTER
DATA TAPE
FOR
STATHAM, GA

63.2 1.	67.2 0.	71.2 1.
63.4 0.	67.4 0.	71.4 0.
63.6 0.	67.6 0.	71.6 1.
63.8 0.	67.8 0.	71.8 1.
64. 0.	68. 0.	72. 0.
64.2 0.	68.2 0.	72.2
64.4 0.	68.4 0.	
64.6 0.	68.6 0.	
64.8 1.	68.8 0.	
65. 0.	69. 1.	
65.2 0.	69.2 0.	
65.4 0.	69.4 0.	
65.6 0.	69.6 0.	
65.8 0.	69.8 0.	
66. 0.	70. 0.	
66.2 0.	70.2 0.	
66.4 0.	70.4 0.	
66.6 0.	70.6 0.	
66.8 0.	70.8 1.	
67. 1.	71. 1.	

"DAY" HRS.

LEQ EQUALS
57.79235443

NIGHT DATA
ENTER NUMBER
OF OCCURENCE

40. 10.	
40.2 2.	
40.4 0.	
40.6 0.	
40.8 0.	
41. 8.	
41.2 0.	
41.4 1.	
41.6 3.	
41.8 0.	
42. 4.	
42.2 0.	

2-7 2-8 2-9

COMPUTER
DATA TAPE
FOR
STATHAM, GA

42.4	46.4	50.4
3.	0.	1.
42.6	46.6	50.6
2.	3.	1.
42.8	46.8	50.8
1.	1.	2.
43.	47.	51.
3.	1.	0.
43.2	47.2	51.2
3.	1.	2.
43.4	47.4	51.4
1.	1.	2.
43.6	47.6	51.6
1.	2.	2.
43.8	47.8	51.8
0.	2.	0.
44.	48.	52.
1.	1.	2.
44.2	48.2	52.2
2.	4.	0.
44.4	48.4	52.4
4.	2.	1.
44.6	48.6	52.6
2.	0.	1.
44.8	48.8	52.8
1.	1.	1.
45.	49.	53.
1.	5.	2.
45.2	49.2	53.2
3.	4.	1.
45.4	49.4	53.4
2.	3.	0.
45.6	49.6	53.6
0.	0.	1.
45.8	49.8	53.8
2.	1.	2.
46.	50.	54.
3.	4.	2.
46.2	50.2	54.2
1.	1.	0.

2-10 2-11 2-12

COMPUTER
DATA TAPE
FOR
STATHAM, GA

54.4	58.4	62.4	
0.	0.	0.	
54.6	58.6	62.6	
0.	0.	0.	
54.8	58.8	62.8	
0.	0.	0.	
55.	59.	63.	
1.	0.	0.	
55.2	59.2	63.2	
1.	0.	0.	
55.4	59.4	63.4	
0.	0.	0.	
55.6	59.6	63.6	
0.	0.	0.	
55.8	59.8	63.8	
0.	0.	0.	
56.	60.	64.	
0.	0.	0.	
56.2	60.2	64.2	
0.	0.	0.	
56.4	60.4	64.4	
0.	1.	0.	
56.6	60.6	64.6	
0.	0.	0.	
56.8	60.8	64.8	
0.	0.	0.	
57.	61.	65.	
0.	0.	0.	
57.2	61.2	65.2	
0.	0.	0.	
57.4	61.4	65.4	
0.	0.	0.	
57.6	61.6	65.6	
0.	0.	0.	
57.8	61.8	65.8	
0.	0.	0.	
58.	62.	66.	
1.	0.	0.	2-15
58.2	62.2		
0.	0.		

2-13 2-14

66.2
CORRECTION
66.
1.
66.2
0.
66.4
0.
66.6
0.
66.8
0.
67.
0.
67.2
0.
67.4
1.
67.6
0.
67.8
0.
68.
0.
68.2
0.
68.4
0.
68.6
0.
68.8
0.
69.
2.
69.2
0.
69.4
0.
69.6
0.

COMPUTER DATA TAPE FOR STATHAM, GA

Page 12 of 18

69.8
0.
70.
0.
70.2
1.
70.4
0.
70.6
0.
70.8
0.
71.
0.
71.2
1.
71.4
0.
71.6
0.
71.8
1.
72.
0.
72.2

"NIGHT" HRS INCLUDING 10 dBA?

LEQ EQUALS
67.42084754

24*HOUR
LDN/LEQ
EQUALS
63.88568616

DAY 2 LDN

M
360.
NUM
880787446.7

2-16

2-17

COMMUNITY
NOISE
LEQ/LDN
PROGRAM

FOR DAY 3

DAYTIME DATA
ENTER NUMBER
OF OCCURENCE

COMPUTER DATA TAPE FOR STATHAM, GA

40.	0.
40.2	0.
40.4	0.
40.6	0.
40.8	0.
41.	0.
41.2	0.
41.4	0.
41.6	0.
41.8	0.
42.	0.
42.2	0.
42.4	0.
42.6	0.
42.8	0.
43.	0.
43.2	0.
43.4	0.
43.6	0.
43.8	0.
44.	0.
44.2	0.
44.4	0.
44.6	0.
44.8	0.
45.	0.
45.2	0.
45.4	0.
45.6	1.
45.8	0.
46.	0.
46.2	1.
46.4	2.
46.6	2.
46.8	1.
47.	2.
47.2	1.
47.4	4.
47.6	1.
47.8	2.
48.	3.
48.2	2.
48.4	2.
48.6	6.
48.8	1.
49.	4.
49.2	2.
49.4	1.
49.6	4.
49.8	2.
50.	5.
50.2	2.
50.4	3.
50.6	2.
50.8	8.
51.	2.
51.2	6.

3-1 3-2 3-3

COMPUTER
DATA TAPE
FOR
STATHAM, GA

51.4 2.	55.4 5.	59.4 0.
51.6 4.	55.6 2.	59.6 0.
51.8 6.	55.8 1.	59.8 0.
52. 6.	56. 0.	60. 1.
52.2 8.	56.2 4.	60.2 1.
52.4 7.	56.4 2.	60.4 0.
52.6 9.	56.6 1.	60.6 0.
52.8 4.	56.8 1.	60.8 0.
53. 8.	57. 3.	61. 0.
53.2 5.	57.2 2.	61.2 0.
53.4 4.	57.4 2.	61.4 0.
53.6 5.	57.6 1.	61.6 0.
53.8 3.	57.8 0.	61.8 0.
54. 7.	58. 3.	62. 0.
54.2 4.	58.2 0.	62.2 0.
54.4 9.	58.4 1.	62.4 0.
54.6 3.	58.6 1.	62.6 0.
54.8 5.	58.8 1.	62.8 0.
55. 8.	59. 1.	63. 0.
55.2 5.	59.2 1.	63.2 0.

3-4 3-5 3-6

63.4	67.4	40.2
0.	0.	0.
63.6	67.6	40.4
0.	0.	3.
63.8	67.8	40.6
0.	0.	0.
64.	68.	40.8
0.	0.	0.
64.2	68.2	41.
0.	0.	6.
64.4	68.4	41.2
0.	0.	0.
64.6	68.6	41.4
0.	1.	0.
64.8	68.8	41.6
0.	0.	3.
65.	69.	41.8
0.	2.	0.
65.2	69.2	42.
0.	0.	2.
65.4	69.4	42.2
0.	1.	0.
65.6	69.6	42.4
0.	1.	0.
65.8	69.8	42.6
0.	1.	0.
66.	70.	42.8
0.	0.	0.
66.2	70.2	43.
0.	1.	3.
66.4	70.4	43.2
0.	0.	0.
66.6	70.6	43.4
0.		3.
66.8		43.6
0.		1.
67.		43.8
0.		4.
67.2		44.
0.		3.

COMPUTER DATA TAPE FOR STATHAM, GA

Page 15 of 18

"DAY" HOURS

LEQ EQUALS
56.90708266

NIGHT DATA

ENTER NUMBER OF OCCURENCE
40.
4.

3-7 3-8 3-9

44.2 0.	48.2 5.	52.2 2.
44.4 3.	48.4 4.	52.4 3.
44.6 3.	48.6 2.	52.6 2.
44.8 0.	48.8 2.	52.8 2.
45. 1.	49. 2.	53. 3.
45.2 2.	49.2 2.	53.2 1.
45.4 0.	49.4 1.	53.4 0.
45.6 3.	49.6 3.	53.6 0.
45.8 0.	49.8 6.	53.8 0.
46. 3.	50. 4.	54. 1.
46.2 2.	50.2 3.	54.2 1.
46.4 3.	50.4 0.	54.4 0.
46.6 1.	50.6 2.	54.6 0.
46.8 2.	50.8 1.	54.8 0.
47. 0.	51. 1.	55. 0.
47.2 1.	51.2 4.	55.2 0.
47.4 0.	51.4 0.	55.4 0.
47.6 2.	51.6 1.	55.6 1.
47.8 1.	51.8 2.	55.8 0.
48. 1.	52. 1.	56. 0.

COMPUTER DATA TAPE FOR STATHAM, GA

3-10 3-11 3-12

COMPUTER
DATA TAPE
FOR
STATHAM, GA

56.2	0.	60.2	0.	64.2	0.		
56.4	0.	60.4	0.	64.4	0.		
56.6	0.	60.6	1.	64.6	0.		
56.8	0.	60.8	0.	64.8	0.		
57.	0.	61.	1.	65.	1.		
57.2	1.	61.2	0.	65.2	0.		
57.4	0.	61.4	0.	65.4	0.		
57.6	1.	61.6	0.	65.6	0.		
57.8	0.	61.8	0.	65.8	0.		
58.	0.	62.	0.	66.	0.		
58.2	0.	62.2	0.	66.2	0.		
58.4	0.	62.4	0.	66.4	0.		
58.6	0.	62.6	0.	66.6	0.		
58.8	0.	62.8	1.	66.8	0.		
59.	0.	63.	0.	67.	0.		
59.2	0.	63.2	0.	67.2	0.		
59.4	0.	63.4	0.	67.4	0.		
59.6	0.	63.6	0.	67.6	1.		
59.8	0.	63.8	0.	67.8	0.		
60.	0.	64.	0.	68.	0.		

COMPUTER
DATA TAPE
FOR
STATHAM, GA


```
 68.2
   0.

 68.4
   0.

 68.6
   1.

 68.8
   1.

 69.
   0.

 69.2
   1.

 69.4
   1.

 69.6
   0.

 69.8
   0.

 70.
   1.

 70.2
   0.

 70.4
   0.

 70.6
   0.

 70.8
   0.

 71.
   0.

 71.2
   0.

 71.4
   1.

 71.6
   0.

 71.8
```

"NIGHT" HOURS INCL. 10dBA

LEQ EQUALS
67.69730483

3-16

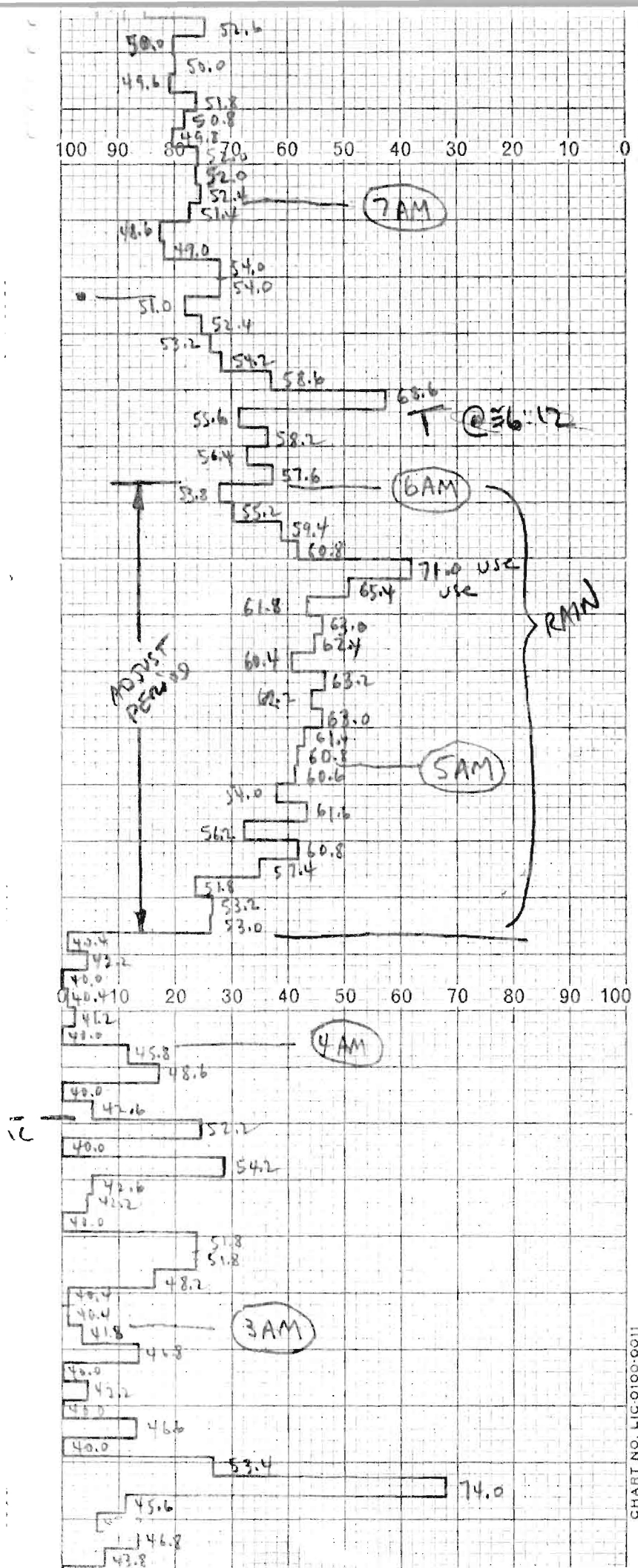
24*HOUR
LDN/LEQ
EQUALS
64.00262503

DAY 3 LDN

M
360.

NUM
9048258595

3-17



RAW DATA GRAPH
of
DAY 1 RAIN PERIOD

STATHAM, GA

DAY 1 ADJUSTMENT CALCULATIONS

STATHAM, GA

Day 1 Calculation Numerator	1,477,474,232.4
Minus Numerators from 60's Data (13)	-197,583,738.9
Minus Numerators from 50's Data (09)	- 32,193,888.4
Plus Numerators from 53.0 Data (22)	+ 43,895,770.9
Day 1 Adjusted Calculation Numerator	1,291,592,376.0

Day 1 L_{dn} = 10Log (1,477,474,232.4/360) = 66.1 dBA

Day 1 L_{dn} Adjusted = 10Log (1,291,592,376.0/360) = 65.5 dBA

Raw Level	Number	Replaced Data $N \times \text{Log}^{-1}((L_{p_i} + 10)/10)$
59.4	1	8,709,635.8
57.4	1	5,495,408.7
56.2	1	4,168,193.8
55.2	1	3,311,311.2
54.0	1	2,511,886.4
53.8	1	2,398,832.9
53.2	1	2,089,296,1
53.0	1	1,995,262.3
51.8	1	1,513,561.2
	9	32,193,888.4
63.2	1	20,892,961.3
63.0	2	39,905,246
62.6	1	18,197,008.6
62.4	1	17,378.008.3
62.2	1	16,595,869.1
61.8	1	15,135,612.5
60.8	3	36,067,933.0
60.6	1	11,481,536.2
60.4	2	21,929,563.9
	13	197,583,738.9
53.0	22	43,895,770.9

COMPARISON OF
BROKEN DOWN DATA
and
SUMMATION OF DATA DAYS

STATHAM, GA

	"DAY" L_{eq}, dBA ------ and ------ Calculation Numerator Contribution, x	"NIGHT" L_{eq}, dBA -------- and ----- Calculation Numerator Contribution, x'	24 HOUR L_{dn}, dBA -------- and ------- Calculation Numerator Contribution, X
Day 1	58.1 ---------- 146,810,499.4	69.9 ---------- 1,330,663,733.0	66.1 ---------- 1,477,474,232.4
Day 1 Adjusted	58.1 ---------- 146,810,499.0	69.3 ---------- 1,144,781,877.0	65.5 ---------- 1,291,592,376.0
Day 2	57.8 ---------- 135,337,441.2	67.4 ---------- 745,450,005.8	63.9 ---------- 880,787,447.0
Day 3	56.9 ---------- 110,380,100.2	67.7 ---------- 794,445,759.9	64.0 ---------- 904,825,860.1
Days 1, 2, & 3 Taken Together	57.6 ---------- 392,528,040.8	68.5 ---------- 2,870,559,499.0	64.8 ---------- 3,263,087,539.8
Days 1A, 2, & 3 Taken Together	57.6 ---------- 392,528,040.8	68.2 ---------- 2,684,677,643.0	64.5 ---------- 3,077,205,683.8

NOTES:
1) Single "DAY" data includes results from 15x15=225 4-minute L_{eq}'s.
2) Single "NIGHT" data includes results from 15x9=135 4-min. L_{eq}'s.
3) Total day L_{dn} results include data from 225+135=360 4-min. L_{eq}'s.
4) The 10 dBA penalty from 10 PM to 7 AM is included in the above.
5) "DAY" means time exclusive of "NIGHT" which is from 10 PM to 7 AM.
6) Combined "DAY" data includes results from 225x3=675 4-min. L_{eq}'s.
7) Combined "NIGHT" data includes results from 135x3=405 4-min. L_{eq}'s.
8) Total "L_{dn}" (see text) results include data from 675+405=1080 4-minute L_{eq}'s for the combined days.
9) $L_{eq(day)} = 10\text{Log}(x/225)$. $L_{eq(night)} = 10\text{Log}(x'/135)$. $L_{dn} = 10\text{Log}(X/360)$.
10) Replace 225,135, and 360 by 675,405, and 1080 respectively for combined days in above note.

DATA COLLECTED ON TRAINS
DURING MEASUREMENT DAYS
STATHAM, GA.

Date	Time	Direction	No. Engines	No. Cars	Measured Time Between Poles, Sec. (See Note)	Estimated Speed, MPH
4/19/82	10:06 AM	E	5	69	6	59.1
4/19/82	11:26 AM (in Winder)	E	N/A	N/A	N/A	N/A
4/19/82	12:13 PM (in Winder)	W	1	0	N/A	N/A
4/19/82	6:12 PM	W	4	19	10	35.5
4/20/82	10:07 AM	E	5	62	7	50.6
4/20/82	3:39 PM	E	3	96	7.24 8.44 7.17	49 42 49.5
4/20/82	4:19 PM	W	3	56	5	70.9
4/21/82	10:17 AM	E	4	47	6.5	54.8
4/21/82	4:19 PM (also ambulance)	E	3	71	6.1	58.1
4/22/82	8:41 AM	E	4	74	N/A	N/A
4/22/82	9:42 AM	E	2	23	36.3 (Total Time)	N/A

NOTES:
1) Speeds were estimated by timing how long it took the trains to travel from one power pole to another as seen from the measurement location. It was estimated by calculating that the distance involved on the track centerline was 520'.
2) East is towards Athens, West is towards Winder.
3) Statham Police noted these train times on the night of 4/20-4/21/82: 6:50 PM, 7:45 PM, 8:30 PM, 12:40 AM, 1:20 AM, 2:30 AM, 6:30 AM.
4) Statham Police noted these train times on the night of 4/21-4/22/82: 6:50 PM, 9:10 PM, 12:30 AM, 1:30 AM, 1:55 AM, 3:37 AM, 6:00 AM.